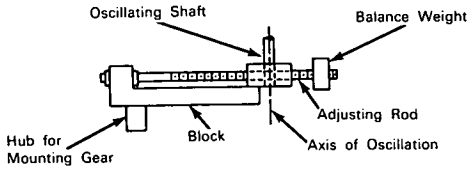
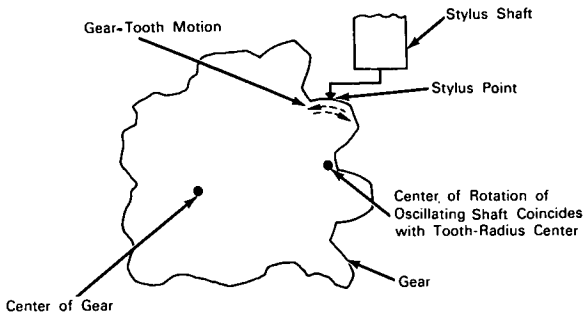
NASA TECH BRIEF

Device Measures Curved Surface Finish on Gear Teeth





The problem: Measuring the surface finish or roughness on the curved portions of gear teeth. Conventional devices, such as profilometers, are designed to measure the finish on flat surfaces and cannot directly be used on convex or concave surfaces.

The solution: A device used in conjunction with a conventional profilometer. The stylus of the profilometer is held stationary (with respect to rotation) in contact with the involute surface of a gear tooth which is made to oscillate over a small circular arc.

How it's done: The device consists of a block containing a hub on which the gear is mounted and a parallel shaft that oscillates the gear over a small arc around the axis of the shaft. The shaft is mounted on bearings and is oscillated by a friction drive. The center-to-center distance between the hub and the shaft is adjustable to accomodate gears of different sizes.

In setting up for a measurement, a gear is mounted on the hub and the rotational center of the shaft is made to coincide with the radial center of one of the gear teeth. The stylus of the profilometer is then placed in contact with the involute surface of the gear tooth and the shaft is set into oscillation. Since the stylus is always directly above the center of the oscillating shaft (and radial center of the gear tooth), it will be constrained to follow the up and down surface irregularities of the gear tooth. The degree of precision of the measurement will depend on how closely the gear-tooth involute approximates a circular arc. The stylus, which may be a magnetostrictive or

(continued overleaf)

piezoelectric pickup, converts the surface irregularities into electrical signals which are transmitted to a recorder.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Western Operations Office
150 Pico Boulevard
Santa Monica, California, 90406
Reference: B65-10064

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: General Electric Co.
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